544.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

544.3 Construction Requirements

544.3.01 Personnel

General Provisions 101 through 150.

544.3.02 Equipment

General Provisions 101 through 150.

544.3.03 Preparation

General Provisions 101 through 150.

544.3.04 Fabrication

General Provisions 101 through 150.

544.3.05 Construction

Repair damaged galvanized areas according to Section 645.

Install deck drain systems according to the Plans.

544.3.06 Quality Acceptance

General Provisions 101 through 150.

544.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

544.4 Measurement

This work is not measured separately for payment.

544.4.01 Limits

General Provisions 101 through 150.

544.5 Payment

This work will be paid for at the Contract Price for deck drain system complete in place.

Payment will be made under:

Item No. 544	Deck drain system—bridge no.___	Per lump sum

544.5.01 Adjustments

General Provisions 101 through 150.

Section 547—Pile Encasement

547.1 General Description

This Item includes furnishing all labor, materials, equipment, and services necessary to clean and encase steel piles as indicated on the Plans. Complete all work according to this Specification and to the Engineer's satisfaction.

547.1.01 Definitions

General Provisions 101 through 150.

547.1.02 Related References

A. Standard Specifications

Section 500—Concrete Structures

Section 514—Epoxy Coated Steel Reinforcement

Section 801—Fine Aggregate

B. Referenced Documents

ASTM 2262

ASTM C 939

ASTM D 737

ASTM D 1682

547.1.03 Submittals

When substituting equal products or systems for one of the two encasement procedures noted in this Specification, obtain approval from the Engineer before use. Submit complete data, including:

- Company name and address
- Description of the product or system previously used on similar projects and how they were used
- List of products and their application
- Length of time the products have been in use (at least three years)
- Length of time the applicator has been in business

547.2 Materials

A. Fabric for Pile Jacket

For encasement systems, use pile jacket fabric that conforms to the following requirements:

Requirements for Pile Jacket Material	
Warp	21 ends per inch (25 mm) 1260 denier
Fill	Nylon 66 fill -- 20 picks per inch (25 mm) 1840 denier
Approximate Weight	Dupont Cordura -- 9 oz per sq yd (305 g/m^2)
Tensile Strength	(ASTM D 1682 grab method at 1 in/min (25.4 mm/min) in excess of 400 lbs/inch (70 N per mm) in both warp and fill directions
Tearing Strength	(Tongue method ASTM 2262)—100 lbs (445 N)
Air Permeability	(ASTM D 737) in excess of 100 ft (30 m) per min.

B. Mortar for Pile Encasement Procedure 2

Maintain mortar at a uniform consistency to avoid pumping problems. When using concrete sand, keep mortar consistency in the 12-second to 15-second range through the 3/4 in (19 mm) orifice of a standard flow cone, as described in ASTM C 939. When using mason's sand, keep consistency in the 30- to 35- second range through a 1/2 in (13 mm) orifice.

1. Admixtures

   When recommended by the manufacturer, use admixtures such as grout super plasticizer, water-reducing agent, or air-entraining agent to improve pumpability or to retard setting time. The Department recommends that a pozzolanic admixture be substituted for up to 30 percent of the cement.

2. Mortar mix for Pile Encasement Procedure 2

   Use mortar mix for pile encasement that conforms to the following proportions:

Cement	1,130 lbs/yd³ (670 kg/m³)
Sand, Concrete, or Masonry	2,000 lbs/yd³ (1187 kg/m³) Subsection 801.2.02
Water	565 lbs/yd³ (335 kg/m³)
Water/Cement Ratio	0.50

C. Epoxy-Coated Steel Reinforcement

Use epoxy-coated steel reinforcement that conforms to Subsection 514.2, "Materials."

D. Class A Concrete Deposited in Water

Use concrete with a 10 percent increase in cement factor. Ensure that concrete is air entrained according to Section 500, with a maximum slump of 8 in. (200 mm).

547.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

547.3 Construction Requirements

General Provisions 101 through 150.

547.3.01 Personnel

General Provisions 101 through 150.

547.3.02 Equipment

General Provisions 101 through 150.

547.3.03 Preparation

A. Cleaning

Sandblast piles on existing structures to be encased to remove loose dirt, rust, scale, and other deleterious material from the surface. Rinse thoroughly with clean water. Do not sandblast piles to be used on new construction. Clean new piles with a wire brush to free them of rust or other loose material.

547.3.04 Fabrication

General Provisions 101 through 150.

547.3.05 Construction

A. Encasement

To perform encasement, follow the details of Figure 1 (Figure 1 metric) and one of the following procedures:

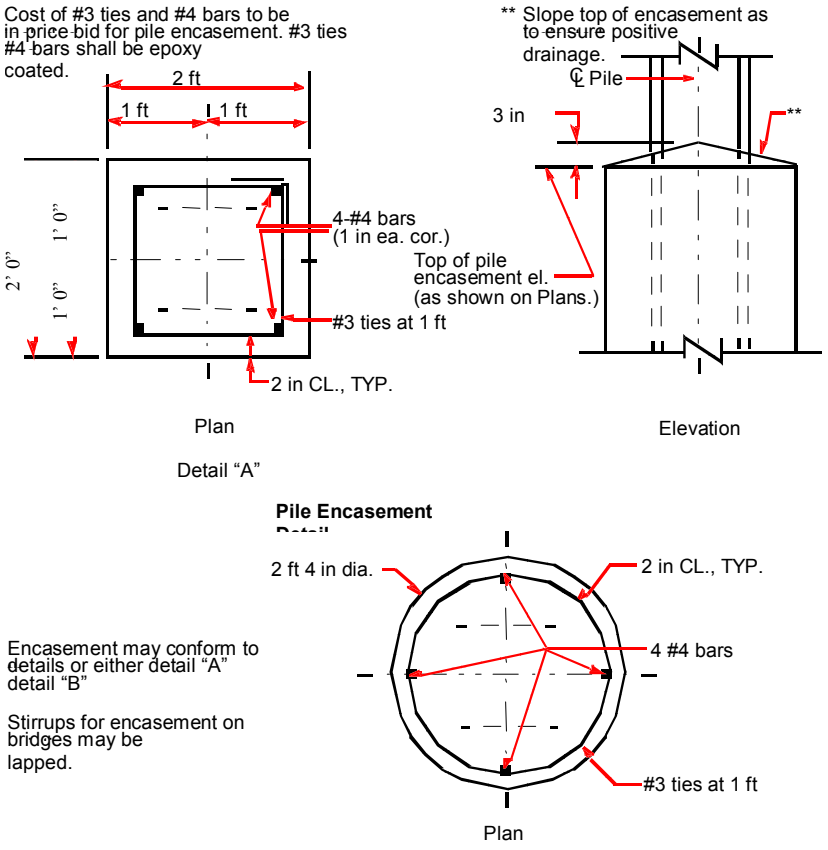

Figure 1

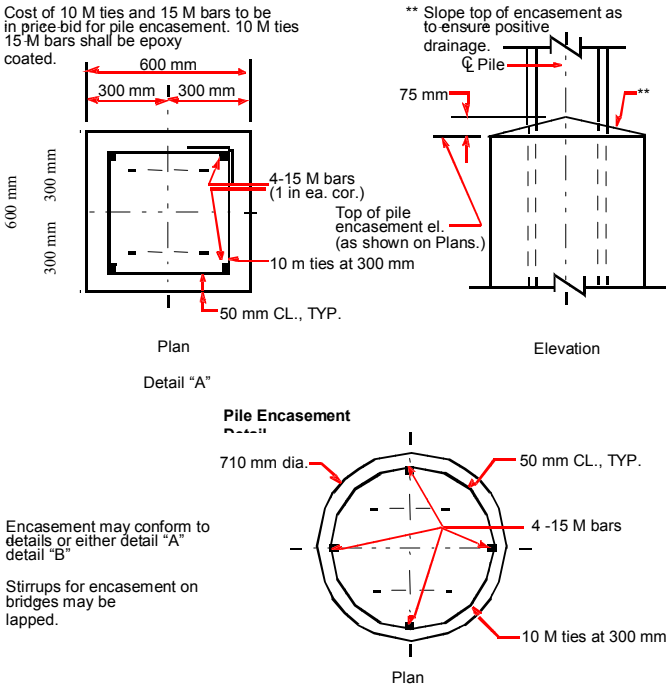

Figure 1 (metric)

1. Procedure 1

   Form the pile encasement with class "A" concrete deposited in water and epoxy-coated steel reinforcement.

   Place the concrete according to Subsection 500.2.01.E, "Concrete Handling and Placing," where site construction conditions allow. The Department will not require cofferdams. Concrete may be deposited in water.

2. Procedure 2

   Form the pile encasement with a Fabriform Pile Jacket System or an approved equal.

   Pump mortar into the fabric jacket using two tremie hoses extending to the bottom of the jacket. Withdraw these hoses during pumping so that the lower end remains 1 to 2 ft (300 to 600 mm) under the rising mortar surface.

   Pump mortar at a rate to provide a rise of approximately 6 in (150 mm) per minute.

B. Installation

After cleaning the pile, place steel reinforcement as shown in Figure 1 (Figure 1 metric). Place spacers, tremie hoses, and fabric jacket or forms according to the Specifications or the manufacturer-recommended methods. Fill the encasement with concrete or mortar.

547.3.06 Quality Acceptance

A. Limits of Encasement

Ensure that the pile encasement extends from 2 ft (600 mm) below the existing streambed to the top elevation for pile encasement, as shown on the Plans.

547.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

547.4 Measurement

Pile encasement is measured by the linear foot(meter) for each pile size indicated.

547.4.01 Limits

General Provisions 101 through 150.

547.5 Payment

Pile encasements will be paid for at the Contract Price per linear foot (meter) for the pile size indicated, complete in place as specified.

This payment will be full compensation for furnishing all materials, tools, labor, equipment, and other items necessary to complete the Work.

Payment will be made under:

Item No. 547	Pile encasement, ___in.(mm) pile	Per linear foot (meter)

547.5.01 Adjustments

General Provisions 101 through 150.

Section 550—Storm Drain Pipe, Pipe-Arch Culverts, and Side Drain Pipe

550.1 General Description

This work includes furnishing and installing the following:

- Storm drain pipe
- Pipe-arch culverts
- Side drain pipe flared end sections
- Tapered pipe inlets

Install structures according to the Specifications and the details shown on the Plans, or as directed by the Engineer.

550.1.01 Definitions

General Provisions 101 through 150.

550.1.02 Related References

A. Standard Specifications

Section 205—Roadway Excavation

Section 207—Excavation and Backfill for Minor Structures

Section 208—Embankments

Section 645—Repair of Galvanized Coatings

Section 834—Masonry Materials

Section 840—Corrugated Aluminum Alloy Pipe

Section 841—Iron Pipe

Section 843—Concrete Pipe

Section 844—Steel Pipe

Section 845—Smooth Lined Corrugated Polyethylene (PE) Culvert Pipe

Section 846—Polyvinyl chloride (PVC) Profile Wall Drain Pipe

Section 847—Miscellaneous Pipe

Section 848—Pipe Appurtenances

B. Referenced Documents

General Provisions 101 through 150.

550.1.03 Submittals

General Provisions 101 through 150.